WHAT IS CLAIMED IS:

1. A WDM (Wavelength Division Multiplexing) light source apparatus comprising:

N SOAs (Semiconductor Optical Amplifier) each having one end coated with a substance having a first reflection factor and the other end coated with a substance having a second reflection factor, the first reflection factor being higher than the second reflection factor, the N SOAs modulating respective input signals into optical signals according to a high-speed data signal to be transmitted, and amplifying the modulated signal;

a 1xN multiplexer/demultiplexer having one end composed of N terminals and the other end composed of one terminal, the N terminals coupled with the N SOAs; and

a reflective mirror, connected to the one terminal of the 1xN multiplexer/demultiplexer, for reflecting a first portion of a signal received from the 1xN multiplexer/demultiplexer.

2. The apparatus as set forth in claim 1, wherein the N SOAs include:

means for allowing each of the N SOAs to create a broadband signal, and outputting the N broadband signal to the end coated with the substance of second reflection factor;

means for applying N broadband signals to the N terminals contained in one side of the 1xN multiplexer/demultiplexer;

means for performing spectrum-slicing on individual broadband signals to create a

multiplexed signal, and outputting the multiplexed signal to one terminal contained in the other side of the 1xN multiplexer/demultiplexer;

means for allowing the first portion of the signals from the means for performing spectrum-slicing to be reflected from the reflective mirror, re-transmitting the reflected signals to one terminal of the 1xN multiplexer/demultiplexer,

means for applying selected signals from among all signals from the means for performing spectrum-slicing to the reflective mirror, and transmitting the selected signals to a data transfer link;

means for demultiplexing the signals retransmitted to the 1xN multiplexer/demultiplexer, and transmitting the multiplexed signals to each one end of the SOAs connected to the N terminals, the one end being coated with the substance of the second reflection factor; and

means for amplifying signals received at the SOAs, reflecting the amplified signals from the second reflection factor substance, and re-transmitting the reflected signals to terminals connected to the 1xN multiplexer/demultiplexer through the one end coated with the second reflection factor substance.

3. The apparatus as set forth in claim 2, wherein the signals transmitted to the data transfer link have a narrow line width approaching a single-wavelength.

4. The apparatus as set forth in claim 3, wherein the line widths of the optical signals are calculated using an equation "each line width = $A/\sqrt{2B}$ ", where A is a Gaussian signal line width changing with frequency band characteristics of the 1xN multiplexer/demultiplexer, and B is a number of times during which the optical signals travel between the SOAs' ends coated with the first reflection factor substance and the reflective mirror.

5. The apparatus as set forth in claim 2, wherein the 1xN multiplexer/demultiplexer is a WGR (Waveguide Grating Router).

6. A method for a WDM (Wavelength Division Multiplexing) light source apparatus, the apparatus including N SOAs each having one end coated with a substance having a first reflection factor and the other end coated with a substance having an second reflection factor, the first reflection factor being higher than the second reflection factor, a 1xN multiplexer/demultiplexer having one end composed of N terminals and the other end composed of one terminal, the N terminals coupled with the N SOAs; and a reflective mirror, connected to the one terminal of the 1xN multiplexer/demultiplexer, the method comprising the steps of:

a) allowing each of the N SOAs to create a broadband signal, and outputting the broadband signal to the end coated with the substance of second reflection factor;

b) applying N broadband signals created at the step (a) to the N terminals contained

in one side of the 1xN multiplexer/demultiplexer;

c) performing spectrum-slicing on individual broadband signals received at the step (b) to create a multiplexed signal, and outputting the multiplexed signal to one terminal contained in the other side of the 1xN multiplexer/demultiplexer;

d) allowing a first portion of the output signals at the step (c) to be reflected from the reflective mirror, re-transmitting the reflected signals to one terminal of the 1xN multiplexer/demultiplexer, applying a second portion of the output signals selected from among all output signals of the step (c) to the reflective mirror, and transmitting the output signal signals to a data transfer link;

e) demultiplexing the signals retransmitted to the 1xN multiplexer/demultiplexer, and transmitting the multiplexed signals to each one end of the SOAs connected to the N terminals, the one end being coated with the substance of second reflection factor;

f) amplifying signals received at the SOAs, reflecting the amplified signals from the second reflection factor substance, and re-transmitting the reflected signals to terminals connected to the 1xN multiplexer/demultiplexer through the one end coated with the second reflection factor substance; and

g) repeating the steps (a) to (f).